



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,060	01/07/2002	Harald Kuhn	GR99P3456	4481

7590 11/04/2003

LERNER AND GREENBERG, P.A.  
Post Office Box 2480  
Hollywood, FL 33022-2480

EXAMINER
----------

ANDERSON, MATTHEW A

ART UNIT	PAPER NUMBER
----------	--------------

1765

DATE MAILED: 11/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/042,060

Applicant(s)

KUHN ET AL.

Examiner

Matthew A. Anderson

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/7/2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kito (JP 11-060390).

Kito discloses a method of producing a SiC single crystal. Figure 1 on page 5 of the Japanese patent shows the setup used including the seed crystal (5), the grown crystal (7), and the SiC source powder (2). The powder is heated and thus sublimed to

Art Unit: 1765

form a SiC gas which condenses on the seed crystal which is at a lower temperature than the source powder. Figure 2 depicts the pressure and temperature at certain points in time. The crucible is brought to growth condition during a starting phase in which the crucible is evacuated and then filled with Ar gas to a pressure to control the sublimation of the gas. The temperature is raised to an intermediate temperature of about 1300°C. The temperature is raised to 2200°C to 2300°C in about 40 minutes (~22.5 °C/min or more). The pressure of the Ar in the crucible is then slowly reduced in stages until the growth pressure of 1 Torr is attained. Then the SiC bulk single crystal is grown by sublimation of the SiC source powder into a gas phase which supplies that growth. The SiC source powder is higher than the seed crystal by about 50 to 100°C (English abstract).

Kito et al. does not specify a heat up temperature of at most 20°C/min from the intermediate temperature.

In respect to claims 1 and 6, it would have been obvious to one of ordinary skill in the art at the time of the present invention to, in a sublimation crucible with solid powder SiC and a seed crystal, evacuate and fill the (with Ar gas) crucible until a growth pressure is reached in the crucible during the starting phase, heat the crucible to an intermediate temperature and then to a higher temperature, and grow the SiC single crystal by sublimation from the powder SiC to supply gas to the seed crystal because such was suggested by Kito et al. as described above.

Further in respect to claims 1, 4, 5, it would have been obvious to one of ordinary skill in the art at the time of the present invention to optimize the ramp up

Art Unit: 1765

temperature to be at most 20°C/ min because such optimization would have been achieved with only routine experimentation and because such slower ramp up would have allowed for more precise temperature control.

In respect to claim 2, it would have been obvious to one of ordinary skill in the art at the time of the present invention to establish a minimum concentration of the SiC gas phase components, above which crystal growth on the SiC seed crystal begins, because Kito discloses controlling the pressure of the Ar and the SiC gas phase components on the crucible during the starting phase.

In respect to claim 3, it would have been obvious to one of ordinary skill in the art at the time of the present invention to optimize the temperature gradient from the seed to the source powder because Kito et al. discloses a temperature difference of 50 to 100 °C and depicts separation from the crystal to the surface of the powder in Figure 1 such optimization would have been achieved with only routine experimentation.

In respect to claims 7, 8, 9, it would have been obvious to one of ordinary skill in the art at the time of the present invention to use a growth pressure of between 1 and 20 mbar, a growth temperature of between 2100°C and 2300°C, and an intermediate temperature of between 1000°C and 1400°C, because Kito suggests using, respectively, a pressure of 1Torr (~ 1.33 mbar), a temperature of 2200-2300°C, and a temperature of 1300°C.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew A. Anderson whose telephone number is (703) 308-0087. The examiner can normally be reached on M-Th, 7:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (703) 305-2667. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

MAA  
October 29, 2003

*SUPERVISORY* NADINE G. NORTON  
PRIMARY EXAMINER

